10/089682

PATENT
930008-2070

JC13 Rec'd PCT/PTC 03 APR 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Ulrich Ratzinger, Serguej Minaev, Stefan Setzer
Serial No.	:	Not Yet Assigned
For	:	DEVICE AND METHOD FOR ION BEAM ACCELERATION AND FOR ELECTRON BEAM PULSE FORMATION AND AMPLIFICATION
Filed	:	
Int'l Appln. No.	:	PCT/EP01/08413
Int'l Filing Date	:	20 July 2001 (20.07.01)
Priority Date	:	17 August 2000 (17.08.00) 18 August 2000 (18.08.00)
Examiner	:	Not Yet Assigned
Art Unit	:	Not Yet Assigned

745 Fifth Avenue
New York, NY 10151

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Preliminary to the examination of the above referenced patent application, Applicants respectfully request that the application be amended as follows:

00059282

Express Mail No.EV001583002US

In the Claims:

Please rewrite claims 3-8, 14-17, 21 and 24-36 as follows:

3. (Amended) Device according to claim 1, characterised in that the output coupler (11) comprises a resonator (15) having in the ion accelerator tank (1) an upper annular gap (16) surrounding the electron beam (14) radially and a lower annular gap (17) surrounding the electron beam (14) radially.

4. (Amended) Device according to claim 1, characterised in that the output coupler (11) comprises a coupling stage (18) arranged between annular gaps (16, 17), which coupling stage surrounds the electron beam (14) coaxially and is arranged radially offset and transverse to the ion beam (3) inside the ion accelerator tank (1), the coupling stage (18) being fastened to a drift tube mounting (19) of the ion beam (14).

5. (Amended) Device according to claim 1, characterised in that the electron beam gun (6) is a Pierce-type electron beam gun.

6. (Amended) Device according to claim 1, characterised in that the high-frequency deflector (7) comprises a homogeneous transversely directed alternating field (20).

7. (Amended) Device according to claim 1, characterised in that the d.c. voltage deflector (8) comprises a non-homogeneous temporally constant transverse electrical field (19).

8. (Amended) Device according to claim 1, characterised in that the output coupler (11) comprises a resonator (15) in its output circuit.

14. (Amended) Device according to claim 10, characterised in that the electron beam gun (6) is a Pierce-type electron beam gun.

15. (Amended) Device according to claim 10, characterised in that the high-frequency deflector (7) comprises a homogeneous transversely directed alternating field (20).

16. (Amended) Device according to claim 10, characterised in that the d.c. voltage deflector (8) comprises a non-homogeneous temporally constant transverse electrical field (19).

17. (Amended) Device according to claim 10, characterised in that the output coupler (11) comprises a resonator (15) in its output circuit (21).

21. (Amended) Method according to claim 19, characterised in that the collector (9) having an opposing field takes up up to 80% of the electron beam energy.

24. (Amended) Method according to claim 22, characterised in that the decoupling of the high-frequency energy is achieved by way of a waveguide which projects, by means of a coupling antenna, into an annular resonator chamber (27) that communicates with the high-frequency energy-rich electron beam (14) by way of an annular gap (25) surrounding the electron beam (14).

25. (Amended) Method according to claim 22, characterised in that the decoupling of the high-frequency energy is effected by way of a waveguide connected to an annular resonator (27) by way of a coupling window, the resonator (15) communicating with the electron beam (14) by way of an annular gap (25) surrounding the electron beam (14).

26. (Amended) Method according to claim 22, characterised in that an electron beam (14) having high perveance according to the Child-Langmuir equation is produced by an electron beam gun (6) with an electron beam of from 20 A to 60 A, preferably from 30 A to 50 A, at an acceleration voltage (U_c) of from 20 kV to 60 kV, preferably from 30 kV to 50 kV.

27. (Amended) Method according to claim 22, characterised in that the electron beam (14) is stabilised transversely in Brillouin equilibrium by means of a longitudinal magnetic field.

28. (Amended) Method according to claim 22, characterised in that the intensity-modulated electron beam (14) excites a narrow-band HF resonator in the output circuit at an operating frequency (f).

29. (Amended) Method according to claim 22, characterised in that the electron beam (14) passes through a homogeneous transversely directed electrical alternating field (20).

30. (Amended) Method according to claim 22, characterised in that from 50% to 80% of the electron beam energy is deflected from the electron beam axis (5).

31. (Amended) Method according to claim 22, characterised in that, at virtually constant electron energy of from 30 keV to 50 keV, the deflected portion of the electron beam is collected in a biased collector (9) having an opposing field of from -30 kV to -40 kV.

32. (Amened) Method according to claim 22, characterised in that the energy of collected electrons is collected in a collector (9) having an opposing field and is fed as a charging current to the cathode of the electron beam gun (6).

33. (Amended) Method according to claim 22, characterised in that the undeflected electron packages move along the electron beam axis (14) at the temporal spacing of an operating frequency (f) and enter an output circuit (21) of the device, which output circuit is in the form of a resonator (15), at a main acceleration voltage of from 200 to 400 kV.

34. (Amended) Method according to claim 22, characterised in that a resonator (15) in the output circuit (21) of the device starts to operate, with high-frequency fields in the resonator (15) taking up the energy of the electrons, decelerating them and feeding an output circuit, preferably a coaxial cable end (24) and/or a waveguide.

35. (Amended) Method according to claim 22, characterised in that residual energy of the electrons is deposited in a main collector (13).

36. (Amended) Method according to claim 22, characterised in that for electronic deflection in the high-frequency deflector (7) for an operating frequency (f) the actuated high-frequency signal

consists of a main component at frequency (f/2) and superposition of frequency (5f/2) at an amplitude ratio of 5:1.

REMARKS

The claims of the above referenced application have been amended to remove all multiple dependencies. No new matter has been added. Accordingly, an early examination of the application is respectfully requested.

The Commissioner is authorized to charge any additional fees that may be required to Deposit Account No. 50-0320.

Respectfully submitted,
FROMMER LAWRENCE & HAUG LLP

By: [signature]

Ronald R. Santucci
Reg. No. 28,988
(212) 588-0800

<u>APPENDIX: (claims with markings)</u>

3. (Amended) Device according to [either] claim 1 [or claim 2], characterised in that the output coupler (11) comprises a resonator (15) having in the ion accelerator tank (1) an upper annular gap (16) surrounding the electron beam (14) radially and a lower annular gap (17) surrounding the electron beam (14) radially.

4. (Amended) Device according to [any one of claims 1 to 3] <u>claim 1</u>, characterised in that the output coupler (11) comprises a coupling stage (18) arranged between annular gaps (16, 17), which coupling stage surrounds the electron beam (14) coaxially and is arranged radially offset and transverse to the ion beam (3) inside the ion accelerator tank (1), the coupling stage (18) being fastened to a drift tube mounting (19) of the ion beam (14).

5. (Amended) Device according to [any one of the preceding claims] <u>claim 1</u>, characterised in that the electron beam gun (6) is a Pierce-type electron beam gun.

6. (Amended) Device according to [any one of the preceding claims] <u>claim 1</u>, characterised in that the high-frequency deflector (7) comprises a homogeneous transversely directed alternating field (20).

7. (Amended) Device according to [any one of the preceding claims] <u>claim 1</u>, characterised in that the d.c. voltage deflector (8) comprises a non-homogeneous temporally constant transverse electrical field (19).

8. (Amended) Device according to [any one of the preceding claims] <u>claim 1</u>, characterised in that the output coupler (11) comprises a resonator (15) in its output circuit.

14. (Amended) Device according to [any one of claims 10 to 13] <u>claim 10</u>, characterised in that the electron beam gun (6) is a Pierce-type electron beam gun.

15. (Amended) Device according to [any one of claims 10 to 14] claim 10, characterised in that the high-frequency deflector (7) comprises a homogeneous transversely directed alternating field (20).

16. (Amended) Device according to [any one of claims 10 to 15] claim 10, characterised in that the d.c. voltage deflector (8) comprises a non-homogeneous temporally constant transverse electrical field (19).

17. (Amended) Device according to [any one of claims 10 to 16] claim 10, characterised in that the output coupler (11) comprises a resonator (15) in its output circuit (21).

21. (Amended) Method according to claim 19 [or claim 20], characterised in that the collector (9) having an opposing field takes up up to 80% of the electron beam energy.

24. (Amended) Method according to claim 22 [or claim 23], characterised in that the decoupling of the high-frequency energy is achieved by way of a waveguide which projects, by means of a coupling antenna, into an annular resonator chamber (27) that communicates with the high-frequency energy-rich electron beam (14) by way of an annular gap (25) surrounding the electron beam (14).

25. (Amended) Method according to [any one of claims 22 to 24] claim 22, characterised in that the decoupling of the high-frequency energy is effected by way of a waveguide connected to an annular resonator (27) by way of a coupling window, the resonator (15) communicating with the electron beam (14) by way of an annular gap (25) surrounding the electron beam (14).

26. (Amended) Method according to [any one of claims 22 to 25] claim 22, characterised in that an electron beam (14) having high perveance according to the Child-Langmuir equation is produced by an electron beam gun (6) with an electron beam of from 20 A to 60 A, preferably from 30 A to 50 A, at an acceleration voltage (U_c) of from 20 kV to 60 kV, preferably from 30 kV to 50 kV.

27. (Amended) Method according to [any one of claims 22 to 26] claim 22, characterised in that the electron beam (14) is stabilised transversely in Brillouin equilibrium by means of a longitudinal magnetic field.

28. (Amended) Method according to [any one of claims 22 to 27] claim 22, characterised in that the intensity-modulated electron beam (14) excites a narrow-band HF resonator in the output circuit at an operating frequency (f).

29. (Amended) Method according to [any one of claims 22 to 28] claim 22, characterised in that the electron beam (14) passes through a homogeneous transversely directed electrical alternating field (20).

30. (Amended) Method according to [any one of claims 22 to 25] claim 22, characterised in that from 50% to 80% of the electron beam energy is deflected from the electron beam axis (5).

31. (Amended) Method according to [any one of the preceding claims 22 to 30] claim 22, characterised in that, at virtually constant electron energy of from 30 keV to 50 keV, the deflected portion of the electron beam is collected in a biased collector (9) having an opposing field of from -30 kV to -40 kV.

32. (Amened) Method according to [any one of claims 22 to 31] claim 22, characterised in that the energy of collected electrons is collected in a collector (9) having an opposing field and is fed as a charging current to the cathode of the electron beam gun (6).

33. (Amended) Method according to [any one of claims 22 to 32] claim 22, characterised in that the undeflected electron packages move along the electron beam axis (14) at the temporal spacing of an operating frequency (f) and enter an output circuit (21) of the device, which output circuit is in the form of a resonator (15), at a main acceleration voltage of from 200 to 400 kV.

34. (Amended) Method according to [any one of claims 22 to 23] claim 22, characterised in that a resonator (15) in the output circuit (21) of the device starts to operate, with high-frequency

fields in the resonator (15) taking up the energy of the electrons, decelerating them and feeding an output circuit, preferably a coaxial cable end (24) and/or a waveguide.

35. (Amended) Method according to [any one of claims 22 to 34] claim 22, characterised in that residual energy of the electrons is deposited in a main collector (13).

36. (Amended) Method according to [any one of claims 22 to 35] claim 22, characterised in that for electronic deflection in the high-frequency deflector (7) for an operating frequency (f) the actuated high-frequency signal consists of a main component at frequency (f/2) and superposition of frequency (5f/2) at an amplitude ratio of 5:1.